Part 8. Emery County

Emery County includes nine municipalities: Castle Dale City, Clawson Town, Cleveland Town, Elmo Town, Emery Town, Ferron City, Green River City, Huntington City, and Orangeville City. Emery is located in the southeastern portion of the state.

A. Demographics and Population Growth

The following information involving Population Estimates, Average Annual Rate of Change, and Population and Development Trends is important in understanding the impacts that a natural hazard may have on a local community (Table 8-1). Population numbers also identify the constancy of a community's population inflow and outflow data.

Table 8-1 Emery County Population

	Emery County	Castle Dale city	Clawson town	Cleveland town	Elmo town	Emery town	Ferron city	Green River city	Huntington city	Orangeville city	Balance of Emery County	Southeast Region
1980 Census Population	11,451											54,124
1990 Census Population	10,332	1,704	151	498	267	300	1,606	881	1,875	1,459	1,591	49,801
2000 Census Population	10,860	1,657	153	508	368	308	1,623	973	2,131	1,398	1,741	
2005 Population Projections	10,667											
2010 Population Projections	11,103											
2015 Population Projections	11,906											
2020 Population	12,455											

Projections												
2030 Population Projections	12,438											
1990-2000 % AARC	0.5 %	-0.3%	0.1%	0.2%	3.3%	0.3%	0.1%	1.0%	1.3%	-0.4%	0.9%	
2000-2030 % AARC	0.45%											0.75%
1990-2000 Percent Change	5.1%											
Rank by 2000 Population	19											
Rank by Percent Change	28											
Rank by AARC	28											

Source: Bureau of the Census, 2002 Baseline Projections, and Utah Population Estimates Committee. Governor's Office of Planning and Budget. 1980 and 1990 populations are April 1 U.S. Census modified age, race and sex (MARS) populations; 2000 populations, household sizes and households are April 1 U.S. Census summary file 1 (SF1) populations; all others are July 1 populations. Note AARC is average annual rate of change.

B. Economy

Emery County's economy struggled in 2002 with non-farm employment falling during the first two quarters; non-farm jobs dropped 4.0 percent in the first quarter and 1.5 percent in the second. The coal mining industry also lost jobs, as did utilities. Construction positions gave the economy a slight boost and manufacturing jobs were basically unchanged. Trucking, information, and local government employment, as well as retail and wholesale trade all saw a slight decline, while federal land management jobs increased. Emery County's economy will likely continue to struggle into 2003 with the national recession and uncertainty over energy prices while the construction and telecommunications growth will continue to provide a buffer to overall job losses (Emery County Trends). The 2000 estimated average house value is $82,909 (Annual Statistical).

C. Transportation and Commuting Patterns

The principle east-west corridor through Emery County is Interstate Highway 70. United States Highways 191 and 6 are main highways for both north-south traffic between Salt Lake City and southeastern Utah, and east-west traffic between Salt Lake City and Denver, Colorado. Along State Highway 10, between Price and Emery, lay the majority of the population of Emery County. Highway 10 is located on the east bench of the Wasatch Range. The Burlington Northern Santa Fe (BNSF) Railroad runs roughly parallel to US highway 6 and 191 from Green River through Price City (Hazard Analysis, Emery).

D. Land Use and Development Trends

Emery County is Utah's seventh largest county in terms of land area. Emery County encompasses 4,445 square miles of land of which 83% is federally owned, 10% is state owned, and 7% is privately owned.

The housing market has changed little in the last five years; the primary change has been an improvement in housing availability. From the fourth quarter of 2000 through the third quarter of 2001, housing costs increased by less than 2% district wide, with Grand County costs driving the increase. During this same period the average home cost in the Carbon and Emery County area sold for $86,376. In Grand and San Juan the average cost of a home through the third quarter of 2001 was $123,827.

Commercial housing development within the district continues to be practically non-existent. Lots are generally sold one at a time to a family that builds and then lives in the home. There is not a demand for the housing development that is seen in the faster growing urban corridor of the state. Also, development of larger multi-family projects is practically non-existent.

E. Risk Assessment

The risk assessment identified the following hazards in Emery County: Drought, Dam Failure, Flood, Earthquake, Severe Weather, and Landslide. Risk assessment maps were completed for the mapped hazards and can be viewed at the end of this section. Refer to maps and Part 6 for an explanation of the risk assessment process. According to this data there are a total of 21 identified critical facilities within Emery County, for the complete list refer to Appendix C.

Representatives from each Emery County jurisdiction contributed to the risk assessment analyses of each hazard within the identified hazard boundary (Section E). Drought, Earthquake, and Severe Weather are regional hazards and have been profiled as such (Part 4 Regional Data).

1. Dam Failure

Hazard Profile

Potential Magnitude		Negligible	Less than 10%
	X	Limited	10-25%
		Critical	25-50%
		Catastrophic	More than 50%
Probability		Highly Likely	
		Likely	
	X	Possible	
		Unlikely	
Location	See map in Section H Dam locations are mainly in the Mid- to northwestern portion of the county.		
Seasonal Pattern or Conditions	Rainy Day Failure happens mainly during heavy precipitation events, can have some warning time. Sunny Day Failure happens with no warning at all can happen at anytime.		
Duration	Hours, Days. Depends on spillway type and area, maximum cfs discharge, overflow or breach type, dam type. Refer to Dam Inventory for more information.		
Analysis Used	Review of BOR inundation maps and plans, FIS, Water Rights.		

Description of Location and Extent

Hazard ratings are determined by downstream uses, size, height, volume and incremental risk/damage assessments. The hazard ratings are: Low-insignificant property loss; Moderate- significant property loss; High- possible loss of life. It should be noted, dam safety hazard classifications are in the event of dam failure and are based upon the consequences of dam failure, the classification of a high hazard dam does not mean that the dam has a high probability of failure.

Table 8.4 Emery County Dam Risk

Dam Name	Hazard	Acre-Feet Storage Capacity
1. BOR Huntington North	High	5,420
2. BOR Joes Valley	High	62,500
3. Cleveland	High	5,340
4. Miller Flat	High	5,560
5. Millsite	High	18,000
6. Utah Power and Light- Electric Lake	High	31,500
7. Castle Valley - Emery Town LWR	Moderate	N/A
8. Castle Valley - Emery Town UPR	Moderate	N/A
9. Castle Valley SP SVC DST- Orangeville	Moderate	N/A
10. Duck Fork	Moderate	N/A
11. Ferron Debris Basin No. 4	Moderate	N/A
12. Ferron Debris Basin No. 5	Moderate	N/A
13. Nielson (John)	Moderate	N/A
14. Potters Pond No. 1	Moderate	N/A
15. Potters Pond No. 2	Moderate	N/A
16. Utah Power and Light- Huntington	Moderate	N/A
17. Utah Power and Light- Huntington Set.	Moderate	N/A
18. Wilberg #1 (Northern)	Moderate	N/A
19. Wilberg #2 (Old Dam)	Moderate	N/A
20. Wilberg #3 (New Dam)	Moderate	N/A
21. Wrigley Springs	Moderate	N/A

* N/A – Not Applicable, none known at this time.

Castle Dale and Orangeville
The Joe's Valley Reservoir was inspected by the Bureau of Reclamation in July of 1990 and was classified to be a high downstream hazard to Orangeville and Castle Dale due partly to the faults that run directly under the reservoir contained by the dam.

Castle Valley Special Service District-Orangeville dam has a moderate hazard rating. It was built in 1983 and is owned by the Castle Valley Special Service District. It has 23 acre-feet reservoir storage at spillway crest and a maximum dam breach flow of 2,000 cfs in a 0.1 square mile drainage basin area. The first downstream town is Orangeville, located just 1 mile away. Castle Dale is just downstream and adjacent to Orangeville to the southeast

Ferron
The Millsite Reservoir was built in 1971 and modified in 1998. This reservoir has a high hazard rating and is owned by the Ferron Canal and Reservoir Company. The reservoir storage at spillway crest is 18,000 acre-feet and the storage at the dam crest is 20,000 acre-feet. The maximum discharge is 5450 cfs and the maximum dam breach flow would be 258,000 cfs. The first downstream town is Ferron located 3 miles away.

The Ferron Debris Basin No. 4 has a moderate hazard rating. This dam was built in 1970 and owned by Ferron Canal and Reservoir & Company. The reservoir storage at spillway crest is 44 acre-feet and the reservoir storage at dam crest is 61 acre-feet. The maximum dam breach flow is 7,000 cfs in a 1 square mile drainage basin area. The first downstream town, Ferron, is only 2 miles away.

The Ferron Debris Basin No. 5 has a moderate hazard rating. The dam's owner is Ferron Canal and Reservoir & Company and the dam was completed in 1970. The reservoir storage at spillway crest is 65 acre-feet with a 207 acre-feet storage area at the dam crest. Maximum dam breach flow would be 10,000 cfs in a 2 square mile drainage basin area. The spillway maximum discharge is 2080 cfs. The downstream town of Ferron is only 1 mile away.

Huntington
Cleveland Reservoir was built in 1909 and modified in 1985. The dam has a high hazard rating and the owner is Huntington-Cleveland Irrigation Company. The reservoir storage at spillway crest is 5340 acre-feet and the storage at dam crest is 6020 acre-feet. The spillway maximum discharge is 2446 cfs and the maximum dam breach flow would be 74,000 cfs in a 9 square mile drainage basin area. The first downstream town is Huntington, 25 miles away.

The Miller Flat Reservoir was built in 1948 and modified in 1985. The dam has a high hazard rating and the owner is Huntington-Cleveland Irrigation Company. The reservoir storage at spillway crest is 5560 acre-feet and the storage at dam crest is 6393 acre-feet. The spillway maximum discharge is 2000 cfs and the maximum dam breach flow would be 99,000 cfs in a 9 square mile drainage basin area. The first downstream town is Huntington, 24 miles away.

The Utah Power and Light- Electric Lake was built in 1974 and has a high hazard rating. The reservoir storage at spillway crest is 31,500 acre-feet and the storage at dam crest is 35,500 acre-feet. The spillway maximum discharge is 2,300 cfs and the maximum dam breach flow would be 175,000 cfs in a 30 square mile drainage basin area. The first downstream town is Huntington, 24 miles away.

Vulnerability Assessment
We were able to overlay municipalities, roads, and critical facilities atop dam identification layers provided by DESHS using GIS to identify the location of the water reservoirs. Refer to the map titled "Emery County Dam Hazard" for the location of the reservoirs listed in Table 8.4 below. In the following narrative downstream towns have been identified that could be potentially affected if a dam were to breach. However, we were unable to evaluate potential dam failure dollar losses due to lack of credible dam inundation map data. The Utah Dam Safety Section is currently working on updating and digitizing dam failure inundation areas for all of the states high hazard dams. It is expected that future revisions of this plan will include these maps.

2. Flood

Hazard Profile

Potential Magnitude		Negligible	Less than 10%
	X	Limited	10-25%
		Critical	25-50%
		Catastrophic	More than 50%
Probability		Highly Likely	
		Likely	
	X	Possible	
		Unlikely	
Location	See map in Section H, mainly the major rivers of the Green River and the San Rafael.		
Seasonal Pattern or Conditions	Spring, Cloudburst Storms and Heavy Snowfall Runoff.		
Duration	Flooding can last anywhere from hours to days and even months.		
Analysis Used	Review of FIS, FIRM, Army Corp of Engineers Flood Study, Hazard Analysis Plans, GIS data		

Description of Location and Extent

Areas, outside the countywide threat that could be affected if there were heavy snowmelt and/or dam failure include farmland along the east bench of the Wasatch Plateau. The towns of Castle Dale, Cleveland, Emery, Ferron, Huntington, Orangeville, and Green River are the most susceptible. Canal systems, such as the earthen Clipper, Western and the Mammoth canals could threaten Orangeville. The Joes Valley Canal, also known as the Cottonwood Creek- Huntington Canal (a 5-mile membrane and 12 mile earthen canal) could affect Orangeville, Huntington, and Castle Dale.

Vulnerability Assessment

We were unable to assess vulnerability in terms of potential losses due to the lack of digital floodplain maps. Because we recognize the need to understand flood vulnerability and to have digitized flood maps, this process of obtaining GIS-compatible data has been included as one or our mitigation actions.

A rudimentary Flood Hazard Identification Study has also been compiled by the Army Corps of Engineers in 2003, addressing areas previously (and sometimes erroneously) identified as *"No Special Flood Hazard"* as well as unmapped jurisdictions in Emery County (Appendix E).

3. Landslide

Hazard Profile

Potential Magnitude	X	Negligible	Less than 10%
		Limited	10-25%
		Critical	25-50%
		Catastrophic	More than 50%
Probability		Highly Likely	
		Likely	
	X	Possible	
		Unlikely	
Location	See map in Section H. Generally occur in canyon mouths and foothill areas.		
Seasonal Pattern or Conditions	Spring and Summer usually caused by the stress release of over-weighted soils and or loosening of rock and debris.		
Duration	Landslides generally last hours or days, but some can last weeks.		
Analysis Used	Information and maps provided by UGS, DESHS, AGRC.		

Description of Location and Extent

Recorded landslides have taken place primarily in the northern portion of the county within Black Butte, Red Plateau, Buckhorn Flat, and Cleveland Lloyd Dinosaur Quarry. Other areas include the northern most tip of the county as well as in the lower western portion near the Coal Cliffs and Molen Reef. Landslides generally occur in well-defined, localized areas, but are not always identifiable and can have countywide impacts.

In 1983, a major landslide event took place in the Town of Thistle outside of Emery County, but severely impacted the county economy. The Thistle slide destroyed the major highway and railroad connecting Eastern Utah with the Wasatch Front. To date the Thistle Landslide has been the most expensive landslide in the United States.

Vulnerability Assessment

The hazard analysis indicates that there are no business or critical facilities in Emery County that are located within the high landslide risk area. Refer to Table 8-5 for the infrastructure damage related to landslides.

Table 8-5 Infrastructure in Landslide Area

Item	Length (Miles)	Replacement Cost
Local Roads	3.80	$7,600,000
State Highways	0.00	$0
US Highways	0.00	$0
US Interstates	0.25	$900,000
Power Lines	0.26	$12,553
Gas Lines	0.00	$0

*There are no known residences, businesses or population located in landslide risk areas in Emery County.

F. Hazard History

Within the mitigation planning process it is important to remember that knowledge of the past is the key to planning for the future. Identifying past hazard events is key in predicting potential location of future hazards. Included in Table 8-6 are hazard events with as much relevant information as was available including date, location, area impacted, and damage costs.

Table 8-6 Hazard Histories

Hazard	Date	Location	Critical Facility/ Area Impacted	Comments
Hail	9/29/1951	Emery County	Highway 10 flooded	Heaviest hailstorm recorded in US.
Cloudburst	08/26/1952	Castle Dale	Buckhorn Wash	1 death
Flood	07/19/1957	Castle Dale	Buckhorn Flat Road	Considerable road damage
Flood	08/08/1957	Castle Dale/ Orangeville City		Flood damage to homes, crops, and streets
Tornado	05/04/1961	Emery City		3k in property damage
Cloudburst	08/25/1961	Moore	Emery Canal, Muddy Creek	Farmland and canal damage
Hail	09/08/1961	Emery City		1” magnitude
Flash Flood	09/21/1962	Woodside	Saleratus Wash	Destroyed section of Highway 6 and railroad track
Flood	08/ 1-2/1964	Orangeville City	Cottonwood Creek	Farmland, canal, and road damage $17,500
Flood	07/25/1965	Emery	Ivie Creek	Farmland, bridge, and irrigations facilities damage
Tornado	05/09/1966	Emery City		
Earthquake	04/03/1967	Emery County	Northwest of Huntington	Richter magnitude 3.4
Flood	05/25/1967	Orangeville City	Clipper Canal	Highway 59 flooded, home and canal damage
Cloudburst	07/17/1967	Green River		Farmland, bridge, and crop damage
Flash Flood	07/23/1967	Ferron City	South Straight Hollow and Dutch Flat Wash	Canal, road, and construction project damage
Cloudburst	08/8-9/1967	Ferron City	Dutch Flat Canal	Ferron watershed project and road damage
Tornado	11/02/1967	Emery City		F2, 25k in property damage
Thunderstorm	07/30/1968	Ferron City	Molen Steeps Wash, Dry Wash	City culinary water system, roads, irrigation flumes damaged and destroyed
Cloudburst	08/01/1968	Ferron City	North Canal	Farmland, road, business damage
Storm	09/09/1969	Huntington City	Huntington Canyon	Damage irrigation systems and crops,

				about $20,000.
Earthquake	08/20/1971	Emery County	North of Green River	Richter magnitude 3.1
Earthquake	04/17/1972	Emery County	San Rafael Swell	Richter magnitude 3.1
Earthquake	11/15/1972	Emery County	Near Emery	Richter magnitude 3.1
Thunderstorm/Wind	03/31/1978	Emery City		50kts.
Thunderstorm/Wind	07/21/1984	Emery City		55kts.
Hail	08/30/1986	Emery City		1.00 inch
Earthquake	8/18/1988	San Rafael Swell	Buckhorn	Richter magnitude 5.3
Earthquake	1988	Fish Lake		Richter magnitude 6.0
Hail	09/21/1988	Emery City		1.00 inch
Hail	09/21/1988	Emery City		0.75 inch
Earthquake	01/29/1989	South Wasatch Plateau	Between Salina and Freemont Junction	Richter magnitude 5.4
Tornado	07/26/1991	Emery City		F0
Tornado	07/26/1991	Emery City		F0
Heavy Snow	01/11/1993	Emery County		1 injury, 1k in property damage
Heavy Snow	01/29/1993	Emery County-not specific		
Heavy Snow	02/01/1993	Emery County-not specific		
Heavy Snow	02/08/1993	Emery County-not specific		
Heavy Snow	02/16/1993	Emery County-not specific		
Lightning	02/04/1994	Orangeville City		1 injury
Heavy Snow	02/04/1994	Emery County-not specific		
Drought/Heat	06/01/1994	Countywide		
Flash Flood	06/19/1994	Capital Reef		
Flash Flood	06/19/1994	Orangeville City		
Flash Flood	08/11/1995	Ferron City		
Flash Flood	08/23/1995	Huntington City		
Heavy Snow	02/25/1996	Emery County-not specific		1death, 1injury, 10k in property damage
High Wind	03/28/1996	Emery County-not specific		51kts. 17k in property damage
High Wind	12/16/1996	Emery County-not specific		96kts. 6 injury, 100k in property damage
Blizzard	01/11/1997	Emery County-not specific		3 death, 50 injury, 40m in property damage
Hail	06/14/1997	Ferron City		0.75 inch
Flash Flood	07/28/1997	Emery City		40k in property damage
Thunderstorm/Wind	08/12/1997	Green River		61kts. 1 injury, 10k in property damage
Flood	09/13/1997	Ferron City		
Thunderstorm/Wind	09/19/1997	Green River		61kts. 8k in property damage
Heavy Rain	07/28/1998	Green River		45k in property damage, 2k in crop damage
Flash Flood	08/21/1998	Green River		2k in property damage,

				1k in crop damage
Hail	09/29/1998	Ferron		0.75 inch, 1k in crop damage
Winter Storm	10/15/1998	Emery County-not specific		100k in property damage
Winter Storm	11/08/1998	Emery County-not specific		10 injury, 500k in property damage
Winter Storm	12/19/1998	Emery County-not specific		10 injury, 100k in property damage
Extreme Cold	12/21/1998	Emery County-not specific		20 k in property damage
Heavy Snow	04/04/1999	Emery County-not specific		
High Wind	04/15/2002	Emery County		75 kts. 10 injury, 2m in property damage, 100k in crop loss

G. Mitigation Goals, Objectives, Actions

Mitigation Strategies Workbook
Emery County

Note: Countywide in this document refers to a mitigation strategy benefiting the cities, towns and communities of: Huntington, Elmo, Cleveland, Lawrence, Orangeville, Castle Dale, Clawson, Ferron, Emery, Molen, Moore, and Green River.

DAM FAILURE

Countywide Problem Identification
Orangeville and Castle Dale are directly downstream from Joe's Valley Dam and the communities of Cleveland, Emery, Ferron, Green River and Huntington can also be directly impacted from dam failure. Current dam inundation maps may not reflect risk. County should have central location for maps and review on a regular basis

Goal 1: Priority Medium

Objective 1 – Obtain and evaluate inundation maps for all major dams in the County

Action: Obtain funding for engineering in the evaluation of current dam inundation maps
Time Frame: Next five years
Funding: State and Federal grants, dam safety programs
Estimated Cost: Dependent on extend of evaluation
Staff: Contractors, BOR and State Dam Safety
Background: Evaluation of current dam inundation maps is essential for warning and notification systems

Objective 2 – Maintain Communication/Warning Systems for dam failure

Action 1: Evaluate existing warning systems for dam failure
Time Frame: Next two years
Funding: County and State – grants
Estimated Cost: Unknown, probably minimal
Staff: BOR, Dam Engineers, County Emergency Management
Background: Evaluation of current communication and warning systems can be viewed as a base line for future warning and communication needs

Action 2: Install additional warning systems where needed
Time Frame: Next five years
Funding: Unknown
Estimated Cost: Unknown
Staff: County, BOR, State Dam Safety
Background: Development and funding of existing warning systems to include: sirens, reverse 911, satellite phones, and "call down tree"

Action 3: Establish evacuation routes for dam failure
Time Frame: 2 years
Funding: None
Estimated Cost: Minimal
Staff: County Sheriff, City Police, and County Emergency Management
Background: Identified evacuation routes will assist in response to dam failure and help educate public on evacuation measures

Objective 3 – Develop public information on dam failure to include evacuation routes and sheltering plans

Action 1: Identify and maintain access and egress routes throughout the County (SR10/UDOT)
Time Frame: Immediate
Funding: None
Estimated Cost: Minimal
Staff: County Sheriff, City Police, County Emergency Management, School District County Road Dept. and Public Works
Background: Include a map of identified routes for evaluation purposes on County website and in City and County public buildings

Action 2: Establish agreements for emergency shelters
Time Frame: Immediate
Funding: None
Estimated Cost: Minimal
Staff: County Emergency Management, Red Cross, and School District
Background: Pre identifying shelters will assist in evacuation process

DROUGHT

Countywide Problem Identification
Limited water supplies, increasing population and several years of drought place a strain on availability of community culinary water resources and water storage

Goal 1: Priority High

Objective 1: Excessive water used for landscaping

Action: Develop and enforce policies to limit the amount of area that can be used as water requiring landscape.
Time Frame: Ongoing
Funding: Minimal
Estimated Cost: To be determined
Staff: County and Special Service Districts or Water Districts
Background: Emery County has had several years of drought and has at time been unable to supply water to residents on the Manila side of the county.

Objective 2 - Develop more water storage tanks in several areas in the county.

Action: Conduct feasibility study.
Time Frame: 5 years
Funding: Grants
Estimated Cost: Unknown
Staff: Unknown
Background: Water storage is always an issue in times of drought. The ability to adequate store water lessens the impact in areas of the county.

Countywide Problem Identification
Earthen irrigation systems throughout the county.

Goal 2- Priority MEDIUM

Objective 1 - Upgrading irrigation systems.

Action 1: Improve canal in order to have better efficiency of water.
Time Frame: Unknown (depends on funding)

Funding: State and Federal grants and loans.
Estimated Cost: Unknown
Staff: NRCS, UACD, USU Extension, etc. Irrigation Company
Background: Several years of drought and a need for water conservation.

Action 2: Install field sprinkler systems (pressurized, secondary lines)
Time Frame: Ongoing
Funding: Private
Estimated Cost: Unknown
Staff: Private with assistance from Federal agencies
Background: Better usage of agricultural water.

Countywide Problem Identification
Lack of public awareness of efficient water usage.

Goal 3 - Priority HIGH

Objective 1 - Education

Action: Use several ways in educating the public on efficient water usage.
Time Frame: Ongoing
Funding: State, Federal grants, city and county funds, irrigation companies.
Estimated Cost: Minimal
Staff: LEPC, County, Cities and Towns.
Background: Create programs to make the public aware. Use newsletters and the newspapers.

EARTHQUAKE

Countywide Problem Identification
Emery County is the site of at least two active faults. Both are located on the western border of the county in Joe's valley and are named the Joe's Valley Fault. Joe's Valley appears to be highly vulnerable to such an event and an earthquake-induced failure of the dam would put Orangeville and Castle Dale in jeopardy. An updated analysis is needed to evaluate earthquake faults and subsequent risk of damage to buildings and infrastructure in the county.

Goal 1: Priority Medium

Objective 1 - Have a study done to determine seismic resistance of structures within the county I.E. Elementary school, high schools, public buildings, and highways.

Action: Structural and non-structural earthquake hazard assessment.
Time Frame: 3 to 4 years
Funding: Unknown
Estimated Cost: Unknown
Staff: Unknown
Background: Contact DESHS earthquake program specialist. Several seismographic tests have been done within the county most likely for oil.

Countywide Problem Identification
Residents uneducated about earthquakes.

Goal 2: Priority Medium

Objective 1 - Public Awareness

Action: Conduct pubic awareness campaign. Enhance earthquake instructions in school.

Time Frame: Ongoing
Funding: Federal and state grants, local sources.
Estimated Cost: Minimal
Staff: LEPC, volunteers and school administration.
Background: Contact DESHS earthquake program specialist.

Countywide Problem Identification
Requiring building code(s) and zoning ordinance enforcement

Goal 3- Priority MEDIUM

Objective 1 – Verify Building Codes and Zoning Ordinances are updated

Action: Check with Planning and Zoning on building codes.
Time Frame: Ongoing
Funding: Local sources.
Estimated Cost: Minimal
Staff: County, Cities and Town Building Officials and Planning and Zoning Dept.
Background: Ensure building codes are being implemented.

FLOOD

Countywide Problem Identification
There is not enough current flood information on flood areas in Emery County to identify the problem at this time.

Goal 1: Priority Medium

Objective 1 - Identify additional flood prone areas in county

Action: Evaluate need for additional County flood mapping of potential flood hazard areas.
Time Frame: Unknown
Funding: FEMA
Estimated Cost: Undetermined
Staff: State and FEMA personnel.
Background: Contact DESHS flood map specialist.

Action: Participate in the FEMA Flood Map Modernization Program
Time Frame: Ongoing
Funding: FEMA
Estimated Cost: Some cost share may be required.
Staff: County Emergency Management and State Floodplain Office
Background: Emery County has areas that should be reevaluated for flood hazards. Town of Cleveland and City of Green River have indicated their current flood map does not reflect the flood hazard and boundaries are inconsistent.

Countywide Problem Identification
Unstable canals are a flood threat

Objective 1 - To reduce the threat of flood from canal failures in the county

Action: Technical analysis on the irrigation canals
Time Frame: Ongoing
Funding: Unknown
Estimated Cost: Unknown.
Staff: Private, County Engineer

Background: Private canals and irrigation systems have proven to breach or fail flood.

Countywide Problem Identification
Participation in the NFIP allows citizens to mitigate flood damage through purchasing of flood insurance. Residents are not aware flood insurance is available. Communities are not aware of flood damage prevention ordinance that are in place for development in floodplains.

Goal – Priority - MEDIUM

Objective 1 - Promote purchase of flood insurance
Action: Obtain outreach materials on flood insurance
Time Frame: Immediately
Funding: None
Estimated Cost: Printing of FEMA documents
Staff: County and City Floodplain Administrators, County Emergency Management
Background: Flood insurance is an effective mitigation measure.

Objective 2 - Educate local Floodplain Administrators on floodplain compliance.
Action: Make training available on flood compliance and NFIP
Time Frame: 1 year
Funding: None
Estimated Cost: None
Staff: County and City Floodplain Administrators, Building Officials, Planning and Zone, State Floodplain Manager
Background: Contact State Floodplain Manager and arrange training.

SEVERE WEATHER

Countywide Problem Identification
Winter storms, summer thunderstorms, flash floods hail, and high winds over eastern Utah have a dramatic effect on regional commerce, transportation, and daily activity and are a major forecast challenge for local meteorologists.

Goal 1 – Priority HIGH

Objective 1 - protect County from adverse affects of severe weather

Action 1: County participates in the Storm Ready program.
Time Frame: 2 Year
Funding: State and Federal
Estimated Cost: Unknown
Staff: City and County Emergency Management
Background: Set up within the county emergency management and encourage all cities to participate, all requirements of the National Weather Service Storm Ready program.

Action 2: Encourage avalanche preparedness for county backcountry users.
Time Frame: 1 Year
Funding: Minimal
Estimated Cost: Minimal
Staff: County Emergency Management State Hazard Mitigation Team members, Utah Avalanche Forecast Center.
Jurisdictions: Countywide
Background: Avalanches and avalanche preparedness is not often considered when discussing mitigation on the county or city level, yet several people die each year in Utah's backcountry. While the avalanche terrain is mainly on US Forest Service land the

search and rescue for the lost individual in more often than not coordinated by emergency managers with search parties comprised of county and city staff. Introductory avalanche awareness training could lessen the costs to Emery County and the cities within the county. Most avalanche victims die in avalanches started by themselves or someone in there party. Thus, education can limit the number of avalanche related searches each year.

Action 3: Assess EOC's to ensure they are grounded lightning, to include buildings with towers
Time frame: 2-3 years
Funding: Federal Grants
Estimated Cost: Unknown
Staff: County Emergency Management
Jurisdictions: Countywide
Background: Alternate EOC(s), Sheriff's Dispatch, Command Vehicle(s)and associated equipment need to be protected from sever weather events including lightning.

LANDSLIDE
Countywide Problem Identification
There is a potential risk to structures located in areas identified Federal and state agencies and depicted in GIS as landslide risk areas.

Goal 1: Priority Low

Objective 1- Minimize loss of life, damage to property and disruption in residents, commerce and government services caused by landslides through structural measures.

Action 1: Build retaining fences and momentum absorbers along highways prone to landslide and rockfalls, Highway 29, Highway 10.
Time Frame: 5 years
Funding: Federal, State, Local
Estimated Cost: $1,000,000
Staff: UDOT, County Road Dept.
Background: Steep slopes and freeze thaw conditions create hazardous conditions

Action 2: Dislodge large rocks along highways
Time Frame: Immediate
Funding: Federal, State, Local
Estimated Cost: $100,000
Staff: UDOT, County Road Dept.
Background: Steep slopes and freeze thaw conditions create hazardous conditions

Action 3: Build retaining walls on residents identified at risk
Time Frame: 5 years
Funding: Individual
Estimated Cost: Variable
Staff: Unknown
Background: Protect homes in areas at risk.

Action 4: Develop pathways to capture falling rocks adjacent to residences
Time Frame: 5 years
Funding: Federal, State, and Local
Estimated Cost: $100,000
Staff: Cities, towns, and county
Background: Identify areas in residential areas that could accommodate pathways

PROBLEM SOILS

Countywide Problem Identification
Problem soils are a risk to property and life due to its volatility

Goal 1: Priority Low

Objective 1 - Protect roadways

Action 1: Increase width of slope adjacent to roadways
Time Frame: Extended
Funding: Federal, State, and Local
Estimated Cost: Unknown
Staff: State, county, and city
Background: Allows for buffer zone

Action 2: Educate homeowners about problem soil risk
Time Frame: 2 years
Funding: Local
Estimated Cost: $3,000
Staff: Local
Background: County Building Official should have information available to citizens

Action 3: Identify, monitor and control water on alkali soils
Time Frame: Ongoing
Funding: Local
Estimated Cost: Unknown
Staff: Local
Background: Identifying areas of concern will help with planning.

INFESTATION

Countywide Problem Identification
Infestation of noxious insects and can impact the health, safety and welfare of County and its residents.

Goal 1: Priority Low

Objective 1 - Control insects

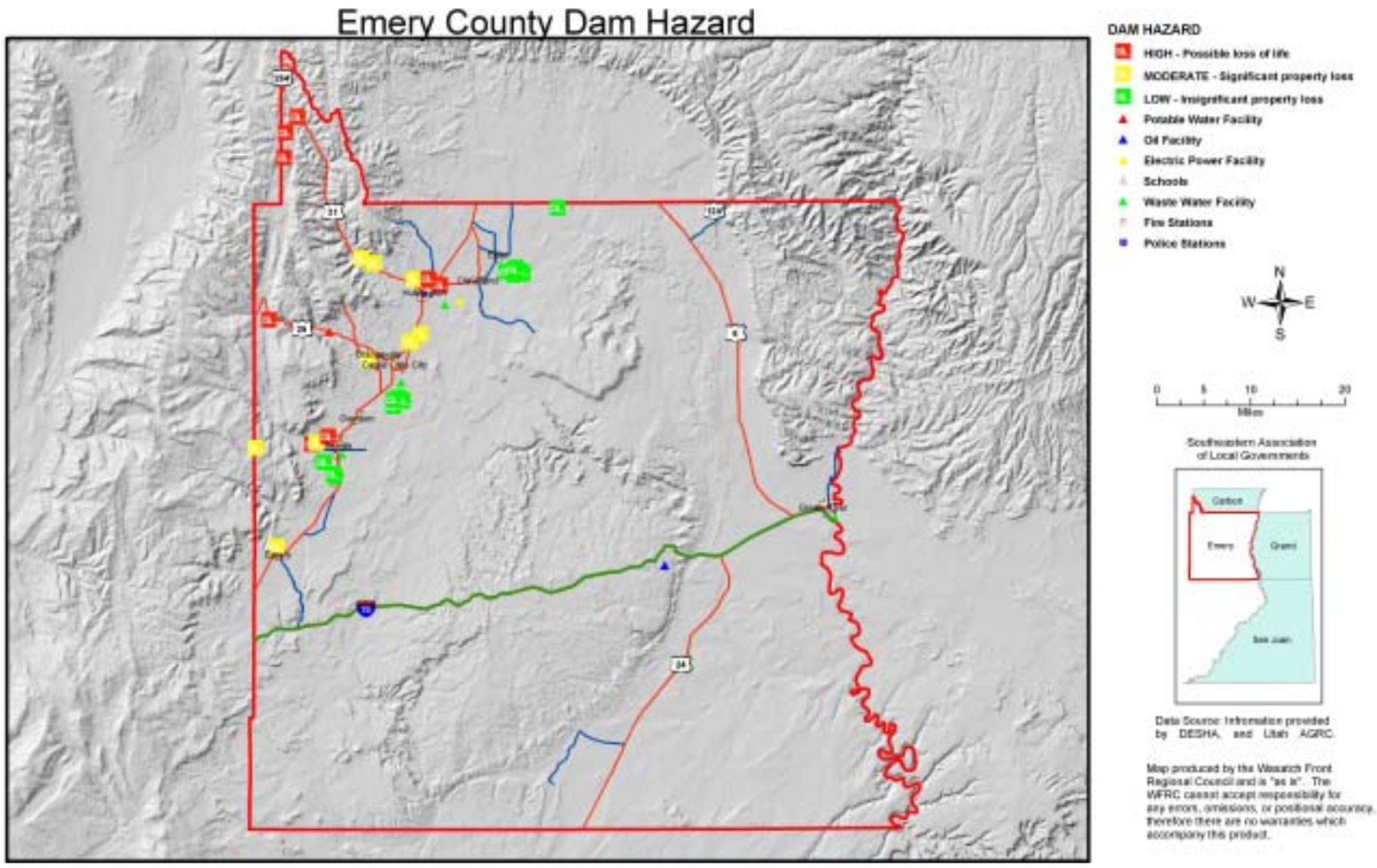
Action 1: Insecticide spray
Time Frame: Ongoing
Funding: Local, State and Federal
Estimated Cost: Unknown
Staff: Local and Federal
Background: Insect abatement districts and federal insect control should be coordinated

Action 2: Remove dead and diseased trees
Time Frame: Extended
Funding: Private
Estimated Cost: Trees will be harvested by commercial enterprise.
Staff: Private
Background: This could be a part of the fire management program and limited spread of infestation

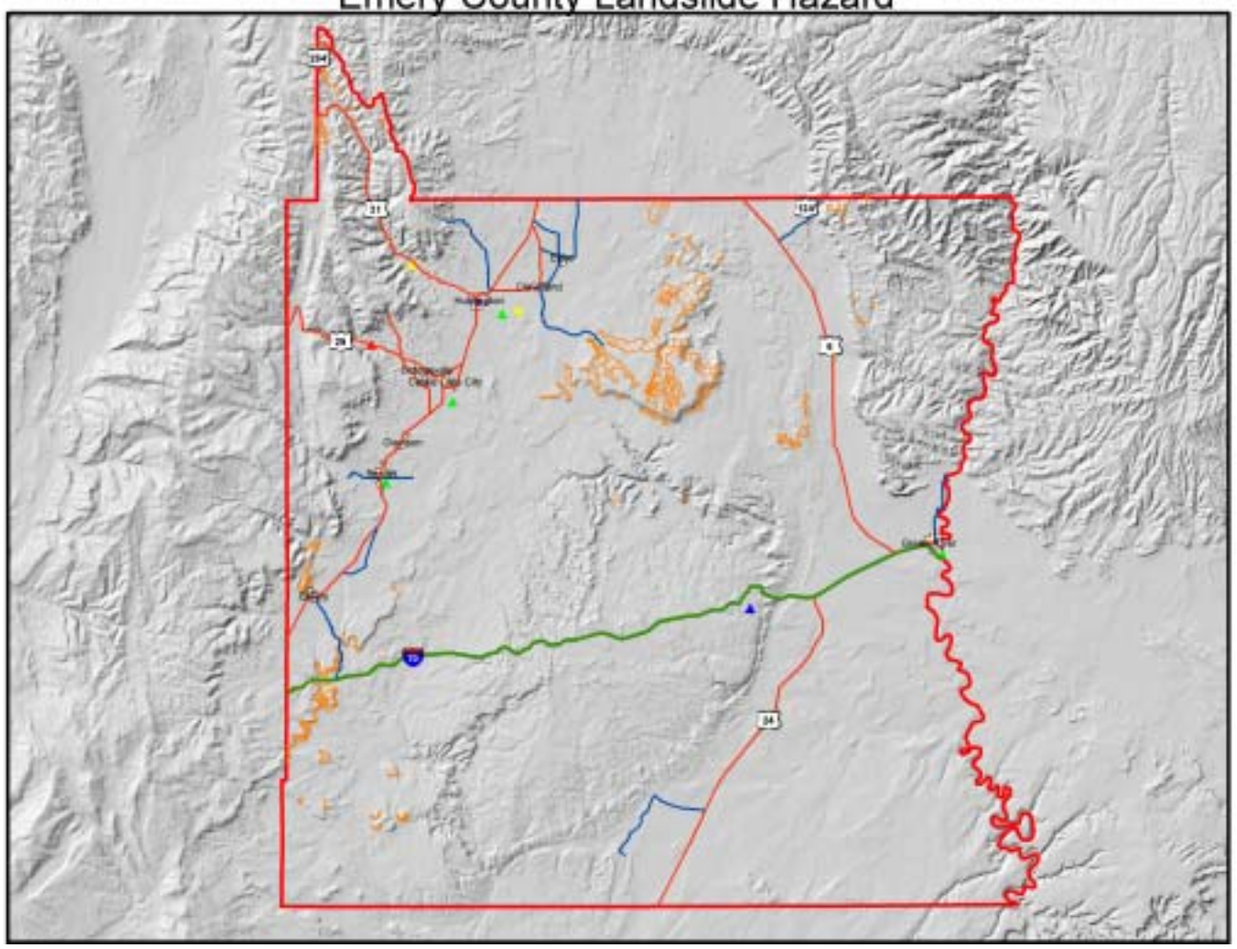
H. Mapping

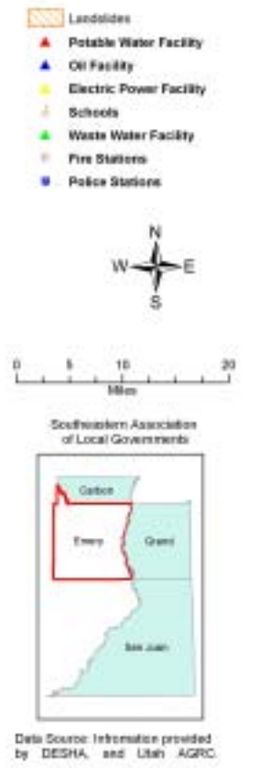
All of the following maps have been created for the purpose of Pre-Disaster Mitigation using the best available data at the time of the creation of this plan. WFRC and its staff members cannot accept responsibility for any errors, omissions, or positional accuracy; therefore no warranties are made respecting their accuracy.

Map 8.1.1 Dam Hazard
Map 8.3.1 Landslide Hazard
Map 8.1 Earthquake Hazard
Map 8.2 Problem Soils

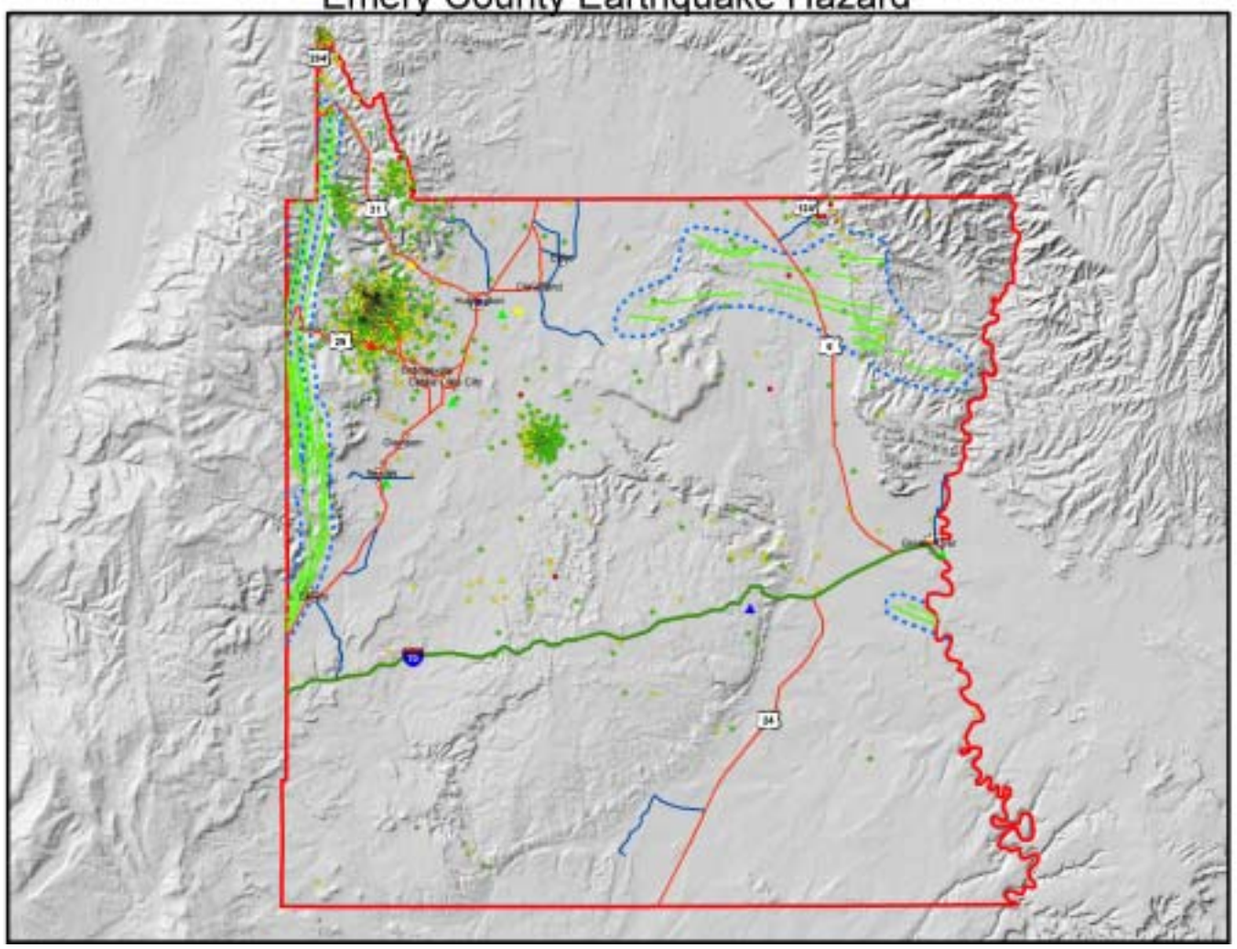

Emery County Dam Hazard
DAM HAZARD
HIGH - Possible loss of life
MODERATE - Significant property loss
LOW - Insignificant property loss
Potable Water Facility
Oil Facility
Electric Power Facility
Schools
Waste Water Facility
Fire Stations
Police Stations
N
W
E
S
0 5 10 20
Miles
Southeastern Association of Local Governments
Carbon
Emery
Grand
San Juan
Data Source: Information provided by DESHA, and Utah AGRC.
Map produced by the Wasatch Front Regional Council and is "as is". The WFRC cannot accept responsibility for any errors, omissions, or positional accuracy, therefore there are no warranties which accompany this product.

Emery County Landslide Hazard





Emery County Earthquake Hazard



Faults
Fault Zones
Epicenters
1 - 2
2 - 3
3 - 4
Potable Water Facility
Oil Facility
Electric Power Facility
Schools
Waste Water Facility
Fire Stations
Police Stations

N
W E
S

0 5 10 20
Miles

Southeastern Association of Local Governments

Data Source: Information provided by DESHA, and Utah AGRC.

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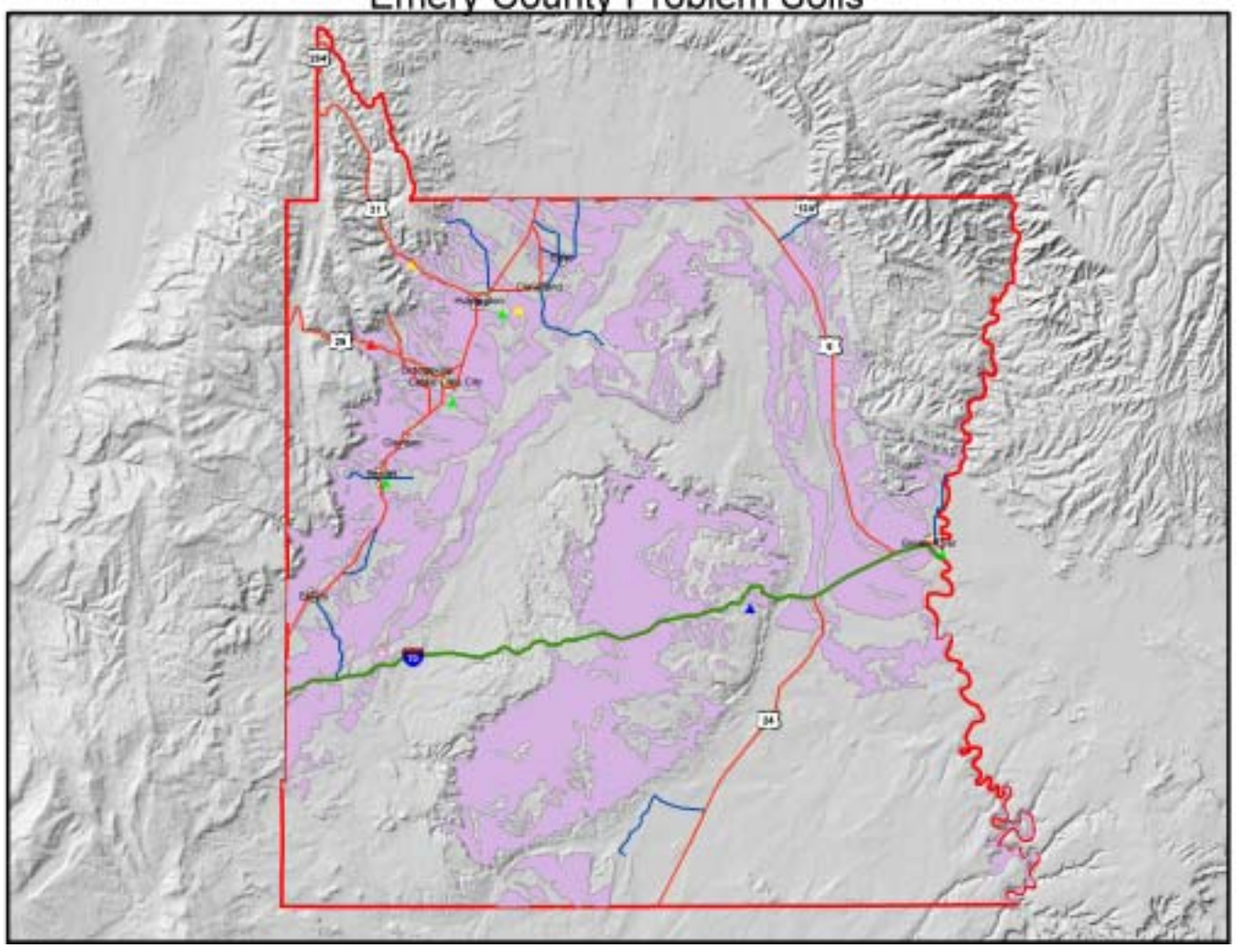
Emery County Problem Soils



Expansive Soil or Rock
Potable Water Facility
Oil Facility
Electric Power Facility
Schools
Waste Water Facility
Fire Stations
Police Stations

N
W E
S

0 5 10 20
Miles

Southeastern Association of Local Governments

Data Source: Information provided by DESHA, and Utah AGRC.

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